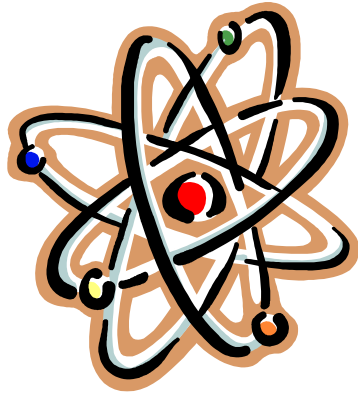


Renewable Energy Insights from “California’s Energy Future”

Bryan Hannegan, Ph.D.
VP – Environment and Renewables, EPRI

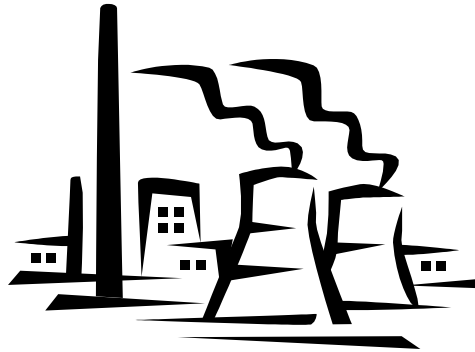
IEPR Lead Commissioner Workshop
June 6, 2012

Low-Carbon Electricity Options



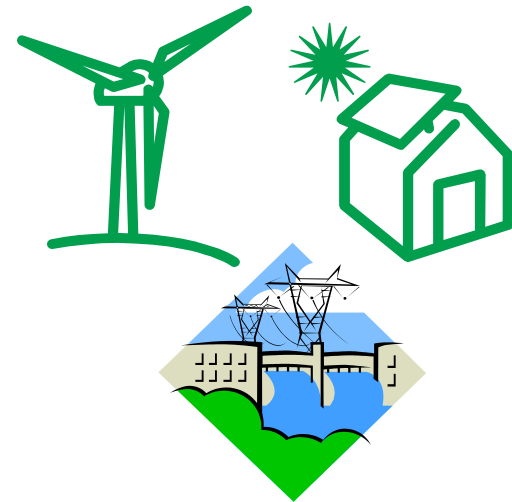
Nuclear

62% nuclear
43GW
33% renewable
5% natl gas
load following



Fossil/CCS

62% fossil/CCS
48 GW
33% renewable
5% natl gas
load following



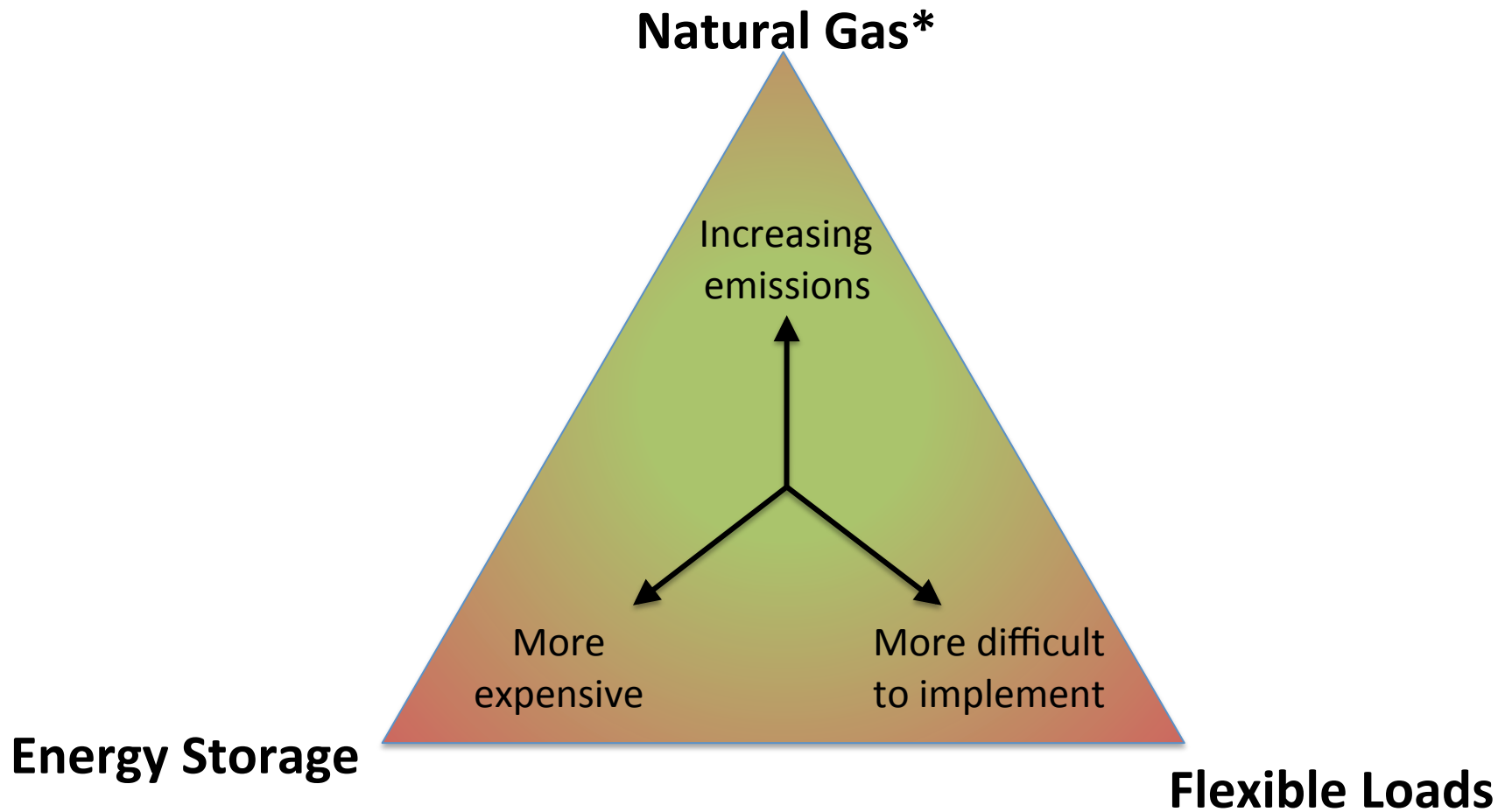
Renewables

90% renewable
(70% intermittent)
150 GW
10% natl gas
following

Barriers to Renewable Energy

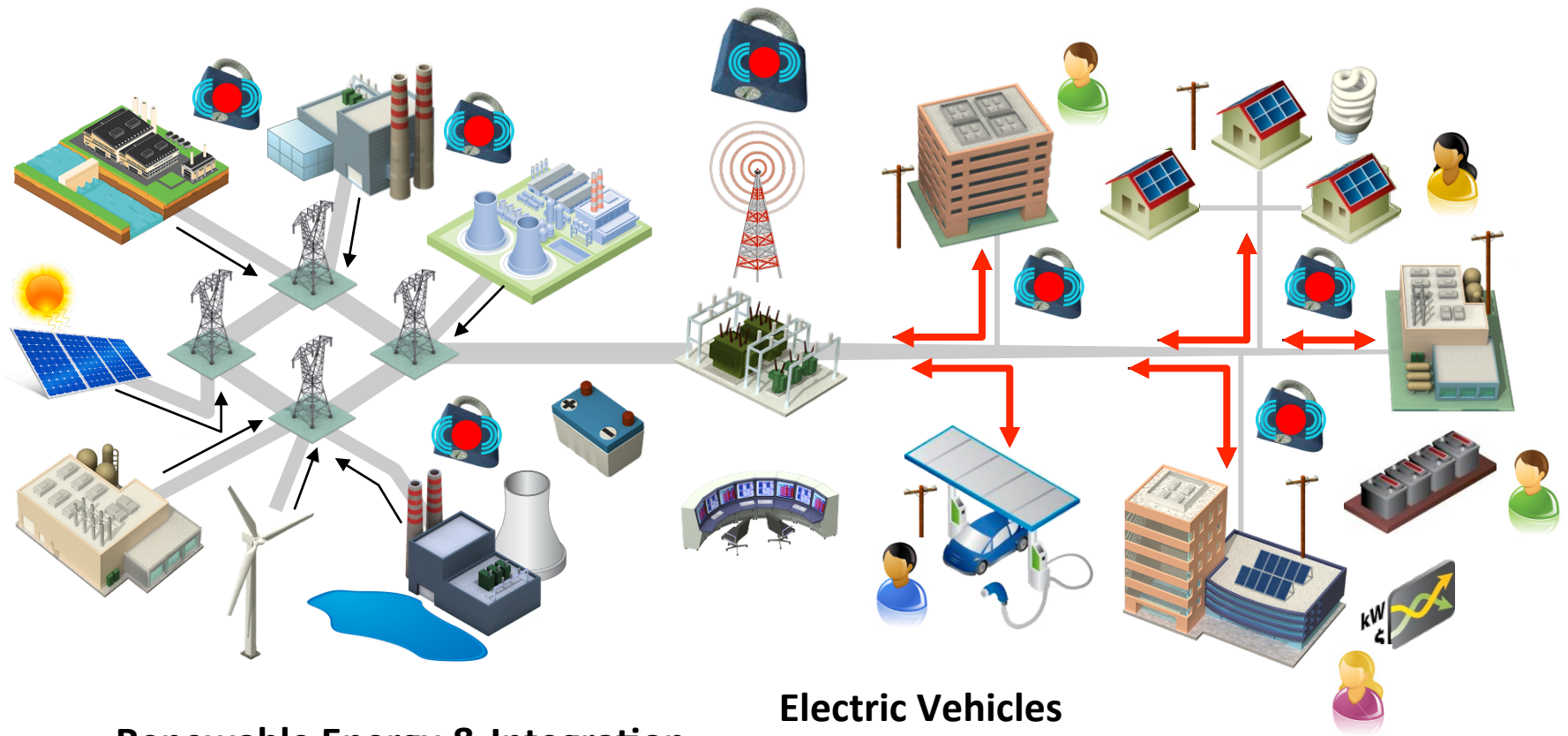
- Improved technology costs and performance
 - Conversion efficiency
 - O&M
 - Environmental controls
- Grid flexibility to balance out variability, particularly for wind, solar
 - Controllable loads, storage, transmission, demand response, electric vehicles
- Water resources for thermal cooling
- Land use and availability

Balancing Supply and Demand



** May be possible with CCS in future*

Power System of the Future



Renewable Energy & Integration
Near-Zero Emissions
Long-Term Operations
Water Management

Electric Vehicles
Demand Response & Efficiency
Distributed Energy Resources
Energy Storage
Sensors, Controls & Cyber Security